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EXAMINER	
ELCENKO, ERIC J	

ART UNIT	PAPER NUMBER
2617	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/724,346	LIM ET AL.	
	Examiner	Art Unit	
	ERIC ELCENKO	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 December 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *4,5,8 and 19-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6,7 and 9-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Arguments

1. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 9-14 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohlson et al. (U.S. Pat. No. 6,222,828) in view of Jung (U.S. Pat. No. 6,483,553) in view of Karabinis et al. (U.S. Pub. No. 2009/0186622)

In regard to Claim 1, Ohlson teaches a method for transmitting packets to mobile stations in a forward link of a multibeam satellite communication system, comprising the steps of: a multicarrier satellite system using a packet-switching method, wherein downlink beams of a satellite share an orthogonal spreading code set for transmitting packets to the mobile stations among beams by synchronizing and transmitting signals of all beams and wherein downlink beams of the satellite have a frame structure that shares the orthogonal spreading codes among users., (*ODS-CDMA system using orthogonal codes for downlink beams, the beams separated into channels which are adjustable for Doppler effects thereby maintaining synchronization Abs; Col 2, Ln 1-21 the users have ways to separate and distinguish themselves from other stations using*

separate codes from an orthogonal code sets. However, the same spreading code is used for each set giving variations through elements called chips and the code is chosen of a given length Col 8, Ln 33-52) a) generating downlink beam signals by using an identical structure for the radio frames transmitted through the downlink beams (*Fig. 13 and 14 show frame structure used on the forward link, Col 21-24 describe the frames in more detail)* and an identical pseudo-noise (PN) scrambling code for generating downlink beam signals (*PN codes, Col 2, Ln 1-22)* and b) synchronizing transmission timings of frames, symbols and spread chips on the downlink beam signals. *(The frames are synced using a sync field contained in the frame, Fig 13-14, Col 22, Ln 56 - Col 23, Ln 28)*

Ohlson does not teach wherein signals in the frame are transmitted by a plurality of subcarriers in the frequency domain, wherein part of the subcarriers in the frame are pilot subcarriers for transmitting pilot signals, which are separated from each other with a frequency spacing over the whole subcarriers so that the mobile station easily performs the channel estimation on a frequency-selective fading channel and wherein the pilot signals transmitted at the pilot subcarriers are signals obtained by spreading a predetermined pilot symbol sequence with an orthogonal pilot spreading code unique to each downlink beam.

Jun teaches wherein signals in the frame are transmitted by a plurality of subcarriers in the frequency domain, wherein part of the subcarriers in the frame are pilot subcarriers for transmitting pilot signals, which are separated from each other with a frequency spacing over the whole subcarriers so that the mobile station easily

performs the channel estimation on a frequency-selective fading channel and wherein the pilot signals transmitted at the pilot subcarriers are signals obtained by spreading a predetermined pilot symbol sequence with an orthogonal pilot spreading code unique to each downlink beam. (*Jung teaches pilot signals are added at fixed interval in the frequency and time axis betweens carriers of data so to reduce selective fading of a frequency in a system, the pilot signals being predetermined prior to transmission (Col 1, Ln 36 to Col 2, Ln 20)*

The combination does not teach reusing spreading codes.

Karabinis teaches a spreading code reuse pattern. The spreading code reuse will increase an efficiency of usage and reduce interface. (*it is well known reuse patterns follow a direct pattern as to reduce interference from the signals. A reuse would be used in the event there is not enough spreading codes to cover the entire area. It is obvious to one of ordinary skill in the art a reuse pattern would be used when there is a higher need for codes than is available. Para 60-66)*

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination to include the teaching of Karabinis in order to increase the efficiency of the resources and available spreading words while reducing interference in the system between the beams.

In regard to Claim 2, Ohlson teaches wherein the frame includes a synchronization subframe for making the mobile station acquire the synchronization on the downlink signals easily, when the mobile station accesses to the multibeam satellite communication system; (*Sync field 308, Col 22, Ln 56 – Col 23, Ln 28)* a control

subframe for transmitting control packets; (*the multiuse field is broken into different types of fields for use as needed, as when in a broadcast control channel to be a signaling field, which is read upon as the control subframe in the instant case, Col 22, Ln 1-22)* and a traffic subframe for transmitting data packets, (*traffic field 314, Col 22, Ln 56-65)* and wherein the signals in the frame are transmitted by a plurality of subcarriers in the frequency domain. (*Abs)*

In regard to Claim 3, Ohlson teaches wherein the synchronization subframe includes a predetermined chip sequence which are identical for all the beams of the satellite system and scrambled by an identical PN scrambling code. (*Col 8, Ln 33-52)*

In regard to Claim 6, Ohlson teaches wherein the data of the control packet transmitted in the control subframe are spread by an orthogonal control spreading code unique to each downlink beam, the control spreading code used in the control subframe is one in a control spreading code group unique to each downlink beam, and there is a one to one relationship between the pilot spreading code and the control spreading code or control spreading code group. (*terminals are distinguished from one another by a code uniquely assigned to each terminal, the code represents a PN spreading code which spreads the signal over the bandwidth. Col 2, Ln 1-22)*

In regard to Claim 9, Ohlson does not teach part of the subcarriers in the subframes are pilot signals spaced out over the whole subcarriers so that the mobile station can perform channel estimation on a frequency selective fading channel or the signals are obtained by spreading a predetermined pilot symbol sequence.

Jung teaches pilot signals are added at fixed interval in the frequency and time axis betweens carriers of data so to reduce selective fading of a frequency in a system, the pilot signals being predetermined prior to transmission. (Col 1, Ln 36 to Col 2, Ln 20)

It would have been obvious to one of ordinary skill in the art to modify Ohlson to include the teachings of Jung. A simple substitution of the pilot signals of Jung into Ohlson would provide predictable results of the received data and pilot signals with the better system performance.

In regard to Claim 10, wherein except for the pilot subcarriers, the rest of the subcarriers in the control subframe and the traffic subframe are data subcarriers used for transmitting the control packet in the control subframe or the data packet in the traffic subframe. (*Col 23, Ln 52- Col 23 Ln 15)*

In regard to Claims 11-14, wherein the data subcarriers are grouped according to a predetermined number of subcarriers in order to form a plurality of frequency slots, and, in the time domain, the control and traffic subframes are divided into a predetermined number of time slots, each slot being divided into a predetermined number of time intervals, each corresponding to a data symbol duration. (*the forward feeder baseband spectrum may be divided into 122 feeder channels as shown in table 3.Col 9-10 The frames are divided into hyperframes, masterframes and frames spread across a specified time interval, each frame being divided further down into 102 symbols. (Col 22 Ln 1-22)*

In regard to Claim 16, Ohlson teaches wherein the control subframe and traffic subframe are divided into radio resource units, each unit defined by is a time slot, a frequency slot and a spreading code, in a three-dimensional fashion. (*Fig 14 shows the frame separation by time and frequency slots and the various symbols.)*

In regard to Claim 17, Ohlson teaches wherein one of more radio resource units are used for transmitting a data packet to a mobile station, and the mobile station is informed which radio resource units are used for the packet transmission by a radio resource allocation message included in the control packet of the control subframe. (*Col 12, Ln 27-68)*

In regard to Claim 18, Ohlson teaches wherein the same radio resource unit of the traffic subframe is reused for transmitting a packet to another mobile station belongs to another beam, only when the interference between the packet transmissions is not more than a predetermined level. (*It is inherent that a subframe would not be reused for another beam if the interference was at a level unusable. There is always a certain level of usability within a system, therefore inherently giving a predetermined level for reuse of the subframe.*)

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohlson et al. (U.S. Pat. No. 6,222,828) in view of Jung (U.S. Pat. No. 6,483,553) further in view of Hall et al. (U.S. Pub. No. 2002/0172180)

Ohlson does not teach is the codes are less than the number of beams to reuse the codes in beams spaced apart.

Hall teaches spreading codes to be reused within the same cell using SDMA concepts which used fixed antennas that are spaced a predetermined distance from one another. (Para 44-46)

It would have been obvious to one of ordinary skill in the art to modify Ohlson to include the teaching of Hall in order to increase the spectral efficiency of the cell.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC ELCENKO whose telephone number is (571)272-8066. The examiner can normally be reached on M-F 7:30 AM through 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Eric Elcenko/

/Patrick N. Edouard/

Supervisory Patent Examiner, Art Unit 2617